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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/606,857	06/28/2000	Jiang Li	MS1-475US	6925

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EXAMINER	
JONES, HEATHER R	

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/606,857	LI ET AL.	
	Examiner	Art Unit	
	Heather R. Jones	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed August 10, 2005 have been fully considered but they are not persuasive.

The Applicant argues on Page 13, lines 15-21 that the Chen reference fails to disclose rendering an image using a pixel-by-pixel determination and selection method. The Examiner respectfully disagrees. The Chen reference discloses using the VR camera to view the panoramic image previously created. The orientation of the VR camera during viewing is used to select which portion of the panoramic image is displayed so that a user can effectively pan about the panoramic image by changing the orientation of the camera (col. 2, lines 51-57). Therefore, Chen uses the camera's orientation to inherently determine pixel-by-pixel which pixels should and should not be displayed. If Chen were not using a pixel-by-pixel determination/selection method the camera would not know which pixels are to be displayed, which would result in the camera trying to display either too many or too few pixels.

The Applicant argues on Page 15, lines 1-4 that Chen does not disclose interpolating, based on the plurality of longitudinal image arrays, to determine the display value for the pixel if more than one of the plurality of image arrays is used. The Examiner respectfully disagrees. In the Chen reference, when the observer is viewing the panoramic image on the display the observer can zoom in closer to a desired part of the scene. It is inherent and well-known in the art

that when the camera zooms in closer interpolation is occurring in order to display the picture at a larger scale than the image was initially taken. Furthermore, one or more of the image columns would be used in order to fill the display device.

The Applicant argues on Page 17, lines 5-13 that Chen does not disclose calculating an angle between the viewing ray and a camera direction at the intersection point, and identifying the one or more of the plurality of image columns based on the calculated angle. The Examiner respectfully disagrees. The VR camera originally took several images and then combined them into one huge panoramic image as can be seen from Fig. 3 of the Chen reference. Then the orientation of the VR camera is used to select which portion of the panoramic image is displayed so that a user can effectively pan about the panoramic image by changing the orientation of the camera. Furthermore, while the panoramic image is being displayed the orientation of the VR camera corresponds to the observer's viewing ray and the camera direction would refer back to the direction the camera was originally in when the camera took the images. Therefore, it is inherent that the angle between the viewing ray and the original camera direction is calculated in order to determine what portion of the image the viewer is observing.

The Applicant argues on Page 19, lines 4-6 that Chen does not disclose using a two-body rigid object model to describe motion of the eye pair. The Examiner respectfully disagrees. According to Fig. 24 of the Applicant's

disclosure a two-body rigid object (the eye pair) possesses six freedoms of motion. The same goes for the invention as disclosed by the Chen reference. Therefore the Chen reference discloses using a two-body rigid object model to describe motion of the eye pair.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 39-52 and 58 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (U.S. Patent 6,552,744).

Regarding claim **39**, Chen discloses a method of rendering a view of a surrounding scene, the method comprising: determining, for the view to be rendered, a viewing position representing a location of an observer that is observing the surrounding scene (col. 2, lines 52-57); and for each pixel in an image to be rendered as a representation of the view of the surrounding scene, determining a viewing ray (observer's line of sight) passing through the pixel in the direction of viewing the observer, and selecting which of a plurality of longitudinally adjacent capture images is to be used to determine a display value for the pixel (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of

longitudinally adjacent capture images will be used to determine the display) (col. 3, lines 44-53).

Regarding claim **40**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing a method wherein the surrounding scene is defined by a capture cylinder (37) including a plurality of longitudinal image arrays generated from a plurality of capture images (Fig. 2; col. 5, lines 20-24; col. 5, line 60 – col. 6, line 5).

Regarding claim **41**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 40 as well as disclosing the method further comprises: determining an intersection point between the viewing ray (observer's line of sight) and the capture cylinder (37); and using the intersection point to determine which one or more of the plurality of longitudinal image arrays to use to determine the display value for the pixel (col. 3, lines 44-53; col. 5, line 60 – col. 6, line 5; col. 7, line 65 – col. 8, line 3; The intersection point will be determined by the O/P sensor (21) with respect to the capture cylinder (37)).

Regarding claim **42**, Chen discloses all the limitations as previously discussed with respect to claims 39-41 as well as disclosing the method further comprises interpolating, based on the plurality of longitudinal image arrays, to determine the display value for the pixel if more than one of the plurality of image arrays is used (col. 7, line 65 – col. 8, line 3; zooming is mentioned as one of the movements that changes the position of the display and when the image is

zoomed in on it is inherent that interpolation is used to create the image on the display and to determine the display values).

Regarding claim **43**, Chen discloses all the limitations as previously discussed with respect to claims 39-41 as well as disclosing a method wherein the selecting further comprises determining, based on the intersection point, which one or more of a plurality of image columns in each of the one or more of the plurality of longitudinal image arrays to use to determine the display value for the pixel (col. 7, line 65 – col. 8, line 3; zooming is mentioned as one of the movements that changes the position of the display and when the image is zoomed in on it is inherent that interpolation, which would include selecting certain image columns based on the intersection point, is used to create the image on the display and to determine the display values).

Regarding claim **44**, Chen discloses all the limitations as previously discussed with respect to claims 39-41 and 43 as well as disclosing the method further comprising interpolating, based on the plurality of image columns, to determine the display value for the pixel if more than one of the plurality of image columns is used (col. 7, line 65 – col. 8, line 3; zooming is mentioned as one of the movements that changes the position of the display and when the image is zoomed in on it is inherent that interpolation is used to create the image on the display and to determine the display values).

Regarding claim **45**, Chen discloses all the limitations as previously discussed with respect to claims 39-41 and 43 as well as disclosing a method

wherein determining which one or more of the plurality of image columns to use comprises: calculating an angle between the viewing ray (observer's line of sight) and a camera direction at the intersection point; and identifying the one or more of the plurality of image columns based on the calculated angle (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of image columns are to be used. It is inherent that Chen uses the angle between the viewing ray and the camera position is determined in order to show the correct portion of the scene that the observer is viewing.).

Regarding claim **46**, Chen discloses all the limitations as previously discussed with respect to claims 39-41 and 43 as well as disclosing a method wherein the selecting further comprises determining, based on an elevation angle of the viewing ray, which one or more longitudinally adjacent capture images to use to determine the display value for the pixel (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which one or more longitudinally adjacent capture images are to be used to determine the display value for the pixel. It is inherent that the elevation angle would be determined to correctly display the scene the observer is looking at since one of the movements the observer is allowed to make is up and down (col. 7, line 65 – col. 8, line 3)).

Regarding claim **47**, Chen discloses all the limitations as previously discussed with respect to claims 39-41, 43, and 46 as well as disclosing a method wherein the selecting further comprises determining, based on the elevation angle of the viewing ray, which one or more pixels from the one or more capture images to use to determine the display value for the pixel (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of image columns. It is inherent that the elevation angle would be determined to correctly display the scene the observer is looking out since one of the movements the observer is allowed to make is up and down (col. 7, line 65 – col. 8, line 3). Also determining which pixels to be used to determine the display value for the pixel to be display would be included as well since zooming is another option the observer is allowed to do and when the image is zoomed in on it is inherent that interpolation, which would include selecting one or more pixels from the captured images to be used to create the image on the display and to determine the display values).

Regarding claim **48**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing the method further comprises rendering a new view of the surrounding scene in response to movement of the observer in one or more of two dimensions (col. 3, lines 44-53; col. 7, line 65 – col. 8, line 3).

Regarding claim **49**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing the method further comprises rendering a new view of the surrounding scene in response to movement of the observer in one or more of three dimensions (col. 3, lines 44-53; col. 7, line 65 – col. 8, line 3).

Regarding claim **50**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 49 as well as disclosing a method wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images (Fig. 2; col. 5, lines 20-24; col. 5, line 60 – col. 6, line 5), and wherein the observer is able to move within the capture cylinder (37) but is constrained such that the field of view of the observer does not exceed the capture cylinder (37) (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **51**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing a method wherein the surrounding scene is defined by a capture images, and wherein the observer is able to move within the capture cylinder (37) but is constrained from moving outside the capture cylinder (37) (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **52**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing a method wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images, and wherein the observer is able to move within the capture cylinder (37) but is constrained from moving outside either the capture cylinder (37) or a circle that is substantially parallel to the ends of the cylinder (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **58**, Chen discloses one or more computer-readable memories containing a computer program (24) that is executable by a processor (19) to perform the method of rendering a view of a surrounding scene, the method comprising: determining, for the view to be rendered, a viewing position representing a location of an observer that is observing the surrounding scene (col. 2, lines 52-57); and for each pixel in an image to be rendered as a representation of the view of the surrounding scene, determining a viewing ray (line of sight) passing through the pixel in the direction of viewing the observer, and selecting which of a plurality of longitudinally adjacent capture images is to be used to determine a display value for the pixel (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation

will determine which of the plurality of longitudinally adjacent capture images will be used to determine the display) (col. 3, lines 44-53).

4. Claims 39, 53-57, and 59-68 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (U.S. Patent 6,552,744).

Regarding claim **39**, Chen discloses a method of rendering a view of a surrounding scene, the method comprising: determining, for the view to be rendered, a viewing position representing a location of an observer that is observing the surrounding scene (col. 8, lines 61 – col. 9, line 5); and for each pixel in an image to be rendered as a representation of the view of the surrounding scene, determining a viewing ray (observer's line of sight) passing through the pixel in the direction of viewing the observer, and selecting which of a plurality of longitudinally adjacent capture images is to be used to determine a display value for the pixel (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of longitudinally adjacent capture images will be used to determine the display) (col. 3, lines 44-53).

Regarding claim **53**, Chen discloses all the limitations as previously discussed with respect to claim 39 as well as disclosing the method further comprises concurrently rendering another view of the surrounding scene, wherein the rendered view corresponds to a viewing position of one eye of an

eye pair and the other rendered view corresponds to a viewing position of another eye of the eye pair (col. 8, lines 61 – col. 9, line 5).

Regarding claim **54**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 53 as well as disclosing the method further comprises rendering a new view for each eye of the eye pair in response to movement of the eye pair in one or more of three dimensions (col. 8, lines 61 – col. 9, line 5; col. 7, line 65 – col. 8, line 3).

Regarding claim **55**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 53 as well as disclosing the method further comprises using a two-body rigid object model to describe motion of the eye pair (It is inherent that the method uses a two-body rigid object mode to describe motion of the eye pair since two different viewing angles are being used (col. 8, lines 61-67).

Regarding claim **56**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 53 as well as disclosing a method wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images, and wherein the eye pair is able to move within the capture cylinder (37) but is constrained such that neither eye of the eye pair can move outside the capture cylinder (37) (Fig. 2; col. 5, lines 20-24; col. 5, line 60 – col. 6, line 5), and wherein the observer is able to move within the capture cylinder (37) but is constrained such that the field of view of the observer does not exceed the capture cylinder (37) (col. 7, line 65 – col. 8, line 3; the

statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **57**, Chen discloses all the limitations as previously discussed with respect to claims 39 and 53 as well as disclosing a method wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images, and wherein the eye pair is able to move within the capture cylinder (37) but is constrained such that neither eye of the eye pair can move outside either the capture cylinder (37) or a circle that is substantially parallel to the ends of the cylinder (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **59**, Chen discloses one or more computer-readable media having stored thereon a computer program (24) that, when executed by one or more processors (19) of a computer, causes the one or more processors (19) to perform acts including: determining, for a view of the surrounding scene to be rendered, a viewing position representing a location of a point of view inside the scene (col. 8, line 61 – col. 9, line 5), wherein the surrounding scene is defined by a capture cylinder (37) including a plurality of longitudinal image arrays generated from a plurality of capture images (Fig. 2; col. 5, lines 20-24; col. 5, line 60 – col. 6, line 5); and for each pixel in an image to be rendered as a representation of the view of the surrounding scene, determining a viewing ray passing (observer's line of sight) through the pixel in a direction of viewing

corresponding to the view, determining an intersection point between the viewing ray and the capture cylinder (37) (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of longitudinally adjacent capture images will be used to determine the display) (col. 3, lines 44-53), using the intersection point to determine which one or more of the plurality of longitudinal image arrays to use to determine the display value for the pixel (col. 3, lines 44-53; col. 5, line 60 – col. 6, line 5; col. 7, line 65 – col. 8, line 3; The intersection point will be determined by the O/P sensor (21) with respect to the capture cylinder (37)); determining, based on the intersection point, which one or more of a plurality of image columns in each one of the more of the plurality of longitudinal image arrays to use to determine the display value for the pixel (col. 7, line 65 – col. 8, line 3; zooming is mentioned as one of the movements that changes the position of the display and when the image is zoomed in on it is inherent that interpolation, which would include selecting certain image columns based on the intersection point, is used to create the image on the display and to determine the display values); determining, based on the elevation angle of the viewing ray, which one or more longitudinally adjacent capture images corresponding to the one or more longitudinally image arrays to use to determine the display value for the pixel (col. 7, line 65 – col. 8, line 3; zooming is mentioned as one of the movements that changes the position of the display and when the image is

zoomed in on it is inherent that interpolation is used to create the image on the display and to determine the display values).; determining, based on the elevation angle of the viewing ray, which one or more pixels from the one or more longitudinally adjacent capture images from the one or more capture images to use to determine the display value for the pixel(The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which one or more longitudinally image arrays are to be used to determine the display value for the pixel. It is inherent that the elevation angle would be determined to correctly display the scene the observer is looking at since one of the movements the observer is allowed to make is up and down (col. 7, line 65 – col. 8, line 3)); and determining the display value for the pixel based on the display values of each of the one or more pixels (The O/P sensor (21) will determine the observer's orientation, which would include the observer's line of sight. Furthermore, the observer's position along with the observer's orientation will determine which of the plurality of image columns. It is inherent that the elevation angle would be determined to correctly display the scene the observer is looking out since one of the movements the observer is allowed to make is up and down (col. 7, line 65 – col. 8, line 3). Also determining which pixels to be used to determine the display value for the pixel to be display would be included as well since zooming is another option the observer is allowed to do and when the image is zoomed in on it is inherent that interpolation, which would

include selecting one or more pixels from the captured images to be used to create the image on the display and to determine the display values).

Regarding claim **60**, Chen discloses all the limitations as previously discussed with respect to claim 59 as well as disclosing one or more computer-readable media wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images, and wherein the observer is able to move within the capture cylinder (37) but is constrained from moving outside the capture cylinder (37) (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **61**, Chen discloses all the limitations as previously discussed with respect to claim 59 as well as disclosing one or more computer-readable media wherein the surrounding scene is defined by a capture cylinder (37) generated from a plurality of capture images, and wherein the observer is able to move within the capture cylinder (37) but is constrained from moving outside either the capture cylinder (37) or a circle that is substantially parallel to the ends of the cylinder (col. 7, line 65 – col. 8, line 3; the statement "to allow the user to select which portion of a panoramic image" to view implies that the user is constrained within the capture cylinder (37)).

Regarding claim **62**, Chen discloses all the limitations as previously discussed with respect to claim 59 as well as disclosing one or more computer-readable media further comprise concurrently rendering another view of the

surrounding scene, wherein the rendered view corresponds to a viewing position of one eye of an eye pair and the other rendered view corresponds to a viewing position of another eye of the eye pair (col. 8, line 61 – col. 9, line 5).

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather R. Jones whose telephone number is 571-272-7368. The examiner can normally be reached on Mon. - Thurs.: 7:00 am - 4:30 pm, and every other Fri.: 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Groody can be reached on 571-272-7950. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Heather R Jones
Examiner
Art Unit 2616

November 1, 2005
HRJ

James J. Groody
Supervisory Patent Examiner
Art Unit 262 2616